

# **Manhole Condition Assessment Protocol**



**City of Jackson  
Department of Public Works**

**June 2017**

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## **1 INTRODUCTION**

A sewer manhole is an essential component of the sewer system which provides the necessary access point for maintenance needs. All underground utilities will deteriorate over time and sewer manholes are no different. Identifying manhole deterioration or structural problems early on can help prevent catastrophic conditions. Conducting periodic condition assessments or inspections of manholes will help to identify potential problems and allow time to make the needed repairs. Manhole inspections are often performed in an area previously identified or suspected of having deteriorated or structurally deficient sewers and/or excessive Infiltration/Inflow (I/I). Manhole inspections can identify I/I sources and describe the structural condition of the manhole, as well as the condition of the inlet and outlet sewers.

MACP Level 2 inspections shall be performed for all manholes, unless a manhole cannot be found or opened. A level 1 inspections shall be performed for all manholes that can not be opened. Above ground inspection” examining the condition of the surface around the manhole including the manhole frame and cover shall be performed. Internal components of each manhole shall be completed through the use of cameras, specializes equipment , video, or mirrors. confined space entry may be required in certain instances.

A manhole inspection is best performed during periods of high groundwater and low wastewater flow. Low flow conditions facilitate observation of manhole/sewer condition while high groundwater conditions may provide evidence of infiltration.

Any manhole “touched” as a part of the inspection effort will require a facilities survey. The objective of the facilities survey is to provide surveyed locations and elevations (GPS coordinates). Invert elevations and pipe diameters for the inlet and outlet sewers must also be measured.

Manhole Inspection and other field investigations should be coordinated to avoid duplicating effort. Manhole inspection may also be conducted concurrently with flow monitoring, smoke inspection, dyed water testing and/or closed-circuit television (CCTV) inspection.

Subsequent sections of this Protocol will use the term “*Inspector*” to describe the firm, crew and/or individual involved with the manhole inspection and/or associated field surveys. Since City personnel, Professional Services contractors and A/Es may all be conducting inspections covered by this document, a general term is being used.

## **2 NOTIFICATION PROCEDURES**

### **2.1 General**

Inspection procedures often require notifying both the public and the City. *Inspectors* conducting field inspections must be familiar with these notification requirements and must comply with these procedures throughout the contract period. Notifications required include, but are not limited to, those given below.

### **2.2 Public Notification**

The majority of manhole inspections will be performed in the public right-of-way. Therefore, notification of residents and commercial property owners will be required only for those manholes located on private property and/or in easements that require special access. Notification should be on a person-to-person basis. The crew leader should inform residents and owners when the crew will require access to manholes on private property and what equipment, if any, will be necessary to perform the inspection. A flyer or door hanger with a description of the work to be performed, hours of work and duration should be shown to the resident or owner during that meeting. A copy of any flyer used for this purpose is to be provided to the City prior to its distribution to the public (see Appendix A-1). If the resident or owner is not available for a meeting, the flyer will be left at the residence or commercial property. The notification flyer will inform the occupants of the purpose of the work, what might possibly occur, and contact telephone numbers to call in case of questions or problems.

The *Inspector* shall maintain a log with a list of all residents/property owners notified during the project. The log will include, at a minimum, the resident's name and address, notification date(s), inspection date(s), and any concerns raised by the resident. This log will be updated daily and may be reviewed by the City at any time during the project. The log shall be included in the project report. If any resident refuses access to their property, the *Inspector* shall immediately report the situation to the City Project Manager.

### 3 REQUIREMENTS FOR INSPECTION AND DATA COLLECTION

#### 3.1 General

These requirements are written to promote data collection consistency throughout the entire system and are not intended as step-by-step instructions. *Inspectors* are expected to use their experience and best professional judgment during all phases of manhole inspection.

The field procedure components include: Planning, Safety, Setup, Equipment, Inspection, and Documentation. Manhole inspection includes surface inspection and internal inspection. The Facilities Survey includes above ground and subsurface surveying.

#### 3.2 Personnel

The *Inspector* shall provide adequate personnel for performance of the work. For inspections completed (defects coded) in the field, at least one crew member per inspection crew shall be a National Association of Sewer Service Companies (NASSCO) certified Manhole Assessment and Certification Program (MACP) inspector. Certified personnel are not required for performance of 3D manhole scans that are not interpreted in the field, but certified personnel are required for the subsequent coding of the 3D scans. Personnel performing 3D scans must collect and record all required field data required for a Level 2 inspection.

#### 3.3 Planning

Planning required to perform manhole inspections and facilities surveys is straightforward and consists of providing the manhole inspection/survey crews with:

- A list of the manholes to be inspected/surveyed, including detailed pipe network connectivity information (connect pipe segments);
- A map produced from the City's sewer system geodatabase;
- Field inspection database;
- Appropriate survey equipment capable of the required accuracy for the above and below ground phases of the survey (as described in Section 3.6 Equipment);
- Scanning and photographic equipment; and
- Safety equipment.

#### 3.4 Safety Plan

*Inspectors* must have a comprehensive safety plan to address safety concerns related to the work being performed including, but not limited to, traffic control, personnel safety, and confined space entry before work begins. Each firm involved with these field activities must ensure their field crews follow proper procedures including, but not limited to, the following guidelines:

- The work area shall be properly barricaded to direct pedestrian and vehicular traffic away from the work site following local and state traffic control requirements and the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD).
- All workers shall wear reflective safety vests and other required personal protective equipment while working within the road right-of-way.

- Work should be scheduled to avoid rush hour traffic when possible.
- Schedule nighttime investigations for high traffic volume locations and for locations where daytime flows are high and not readily controlled.

The safety plan shall also include the name of the *Inspector's* safety coordinator with a description of his/her job duties and level of responsibility. The safety plan shall be submitted to the City prior to initiation of work. Failure to meet safety standards will result in immediate shutdown of the field crew and a mandatory meeting with the City Project Manager.

The *Inspector* must certify compliance with 20 CFR 1910.146 (OSHA confined space safety regulations) and all safety requirements required for the project for performance of manned entry for internal inspections. The *Inspector* is responsible for taking all necessary safety precautions in the performance of its services. Since active sewer lines may be entered, the *Inspector* is advised that the sewer and manhole environment may be oxygen deficient, may contain toxic and/or explosive gas vapors and liquids, or may be a source of additional health hazards associated with contact with raw wastewater. No manhole shall be entered without monitoring and documenting the gas levels for CO, H<sub>2</sub>S and O<sub>2</sub> deficiency. Failure of any parameter shall preclude entry. Ventilation may be required to eliminate the hazard. No manhole shall be entered without proper safety equipment.

The *Inspector* shall follow traffic safety procedures when work is conducted in street or highway rights-of-way. Entrance into any manhole shall be considered Confined Space Entry and shall require proper permitting. All NIOSH-OSHA safety standards are applicable and compliance is mandatory.

### **3.5 Setup**

The City has sanitary sewer GIS data and maps that show line location, line size, manhole location, manhole number, and other general information to help locate sewer lines and manholes. Using this data or these maps, the *Inspector* will provide a reconnaissance team that will compile a list of manholes to be surveyed. This list must be submitted to the City for review prior to commencing field operations. The manholes will be named in the same way they are named in the City GIS database. The unique manhole identifier will have a two-letter basin identifier followed by a four-digit sequential number. For example, manhole TN0105 in the Town Creek basin.

The manholes can be difficult to locate in easements or in congested areas (e.g., intersections), where several manholes may be present and some buried or paved over. The *Inspector* will be responsible for conducting a reasonable search to locate missing manholes. The minimum effort to locate missing manholes should include:

- Conducting a field search
- Comparing verified field conditions against available City information.
- Utilizing specialty equipment such as metal detectors and GPS units

If, after conducting a reasonable search of approximately 15 minutes, a manhole cannot be found in the area specified by the sewer maps, the *Inspector* shall document for future assistance. All manholes that require assistance to locate will be documented for submittal. The *Inspector* shall provide the City

appropriate documentation for all manholes determined not to exist or manholes that could not be located. Appropriate documentation includes:

- The manhole number
- The manhole location
- Manhole and pipeline connectivity.
- Description of verification effort, including date and field photograph(s) of area between found adjacent manholes

The *Inspector* shall make all reasonable effort to remove manhole lids. The *Inspector* may find some manhole lids difficult to remove. If, after all efforts have failed, the manhole lid cannot be opened, the *Inspector* shall complete a level 1 inspection and documented for submittal. Such manholes shall be documented in a manner similar to an unfound manhole. The *Inspector* should notify the City immediately if a manhole lid is broken or cracked during opening efforts.

The *Inspector* shall mark the manhole number on the top side of the lid of each structure using a permanent marker or paint. If the manhole is buried under twelve inches or less of soil, grass, or rocks, then the *Inspector* shall remove the soil, grass, or rocks to access the manhole. The *Inspector* shall rebury the manhole after completion of the inspection and return the area to its original condition in all developed or maintained areas. Reburying of manholes in wooded or unmaintained areas is not required. Manholes buried under pavement or under more than twelve inches of soil, grass, or rocks should be brought to the attention of the City Project Manager to determine the course of action for further inspection after the *Inspector* has documented the estimated locations in the field (i.e.: photographs, distances from landmarks, estimated GPS coordinates).

Manhole names sometimes are not identified in the GIS mapping and could be newly constructed manholes. Manholes located in the field, which are not shown shall be documented in the database. The *Inspector* shall will implement changes to the GIS showing the new manholes. In this instance the *Inspector* should label the unknown structure by assigning the structure number of the nearest upstream sanitary sewer manhole followed by an upper-case letter. For example, if the nearest upstream sanitary sewer manhole has a number “TN0105”, the label for this structure would be “TN0105A”. Subsequent unidentified manholes should be assigned consecutive lower case alphabetical letters.

A list of newly discovered manholes shall be submitted to the City. Numbering and coding into the City mapping system will be coordinated by the City, and the new manholes will be assigned permanent facility numbers by the City. Once permanent numbers are assigned by City GIS, these can be substituted for the temporary numbers in the Microsoft Access database.

After a manhole has been located, confirm inventory information and system network connectivity. *Inspectors* should verify connectivity to upstream and downstream manholes, number of pipes entering and leaving manholes compared to the number shown on GIS, flow direction, and pipe material if visible from the surface. Provide network changes and documentation via GIS updates to City.

### 3.6 Equipment

The *Inspector* will provide adequate equipment for the crew to perform all aspects of this inspection in order to obtain the most accurate information possible. Required equipment may include, but is not limited to:

- Metal detector
- Ladder
- Gas detection equipment
- Manhole picks and shovels
- 2-way radios /cellular phone
- Fire extinguisher
- Optical Scanner
- First Aid Kit
- Vehicles and Traffic Control Equipment
- Pole mounted camera
- Safety harness and rope
- 300-foot measuring tape
- Safety cones
- Air mover and hose
- Safety vests

All crews must carry a cellular phone or other form of two-way communication. Required equipment, with information as to specifications, is described below.

- a) *3D Scanner* – A 3D scanner shall be used to perform the manhole condition assessments. The camera shall be a Panorama SI 3D Optical Manhole Scanner, EnviroSight Cleverscan Manhole Scanner, or City approved equal. The 3D scanner uses two high resolution digital cameras with specially designed distortion-free wide-angle lenses. The cameras optically scan the entire interior of the manhole in one single vertical run. The digitally transmitted image data can be viewed by the operator as if it were a live picture.
- b) *Pole Mounted Camera* – For manholes that cannot be accessed with 3D equipment, manhole condition assessment shall be performed using a pole-mounted viewing camera(s) with lighting. The camera shall be a QuickView® zoom camera or City approved equal
- c) *Survey Equipment* - When performing the survey and completing the manhole inspection (See Section 3.7. Inspection and Documentation) the equipment used must be capable of providing measurements that are accurate within the following tolerances:

Horizontal Location Measurement	+/- 1 foot
Elevation of the manhole rim	+/- 0.20 foot
Pipe invert measured from manhole rim	+/- 0.03 foot (for internal inspection)
Pipe invert measured from manhole rim	+/- 1 inch (for surface inspection)
Pipe sizes	+/- 0.25 inch (for internal inspection)
Pipe sizes	+/- 1 inch (for surface inspection )

All equipment shall be in calibration/adjustment and verified against known baseline or existing City survey control with similar relative accuracy prior to use on the project.

- d) *Safety Equipment*. If confined space entry is necessary, the *Inspector* shall provide all equipment necessary for a safe working condition. Safety and emergency apparatus, in conformance with Section 3.4 Safety Plan, shall be on-site. Entry into the manhole cannot depend upon the use of existing manhole steps. All crews shall have equipment for alternative methods of entry available for use during manhole inspections. This equipment shall be in conformance with Section 3.4 Safety Plan.



### **3.7 Inspection and Documentation**

Internal inspections using confined space entry are required when the configuration of the structure does not allow for a proper internal condition assessment from the surface. *Inspector* shall conduct training of the *Inspector's* staff performing the inspections to ensure the condition descriptions will be consistent throughout the survey. Inspections should document identifiable infiltration/inflow sources.

In the event that a condition warrants immediate attention, the crew is to contact City Sewer Maintenance directly with a summary of the condition and specific location. 911 Emergency Dispatch shall be contacted with any situation that poses an immediate danger to the general public.

All field measurements shall be recorded in the English System of Measurement. Typically, such measurements will be recorded in inches (e.g., diameters), or feet (e.g., distance, GPS), as appropriate, and each such attribute are to be consistently recorded in the appropriate unit of measurement.

- a) *Surface inspection* - Following documentation of general information, a surface inspection ("top-side") is undertaken. The surface inspection includes opening the manhole, documenting manhole features and conditions, describing ground level conditions within a 10-foot radius of the cover, and photographing the manhole. Photos shall be taken using a still camera
- b) *Internal inspection* - Following completion of the surface inspection, an internal inspection shall be performed using a 3D scanner (see *d*) below), if possible. If not possible, the internal inspection shall be performed from the surface with a pole mounted camera or via manned entry. Manhole condition ratings shall follow NASSCO MACP v6.0 industry standards and documented in the manhole inspection database, including:
  - Inspection Date/Time;
  - Inspection Crew;
  - Inspection Firm;
  - Manhole Number;
  - Manhole and pipeline connectivity;
  - GPS coordinates: Horizontal - North American Datum of 1983, (NAD 83), Mississippi State Plane Coordinate System, West Zone. Vertical - North American Vertical Datum 1988. (NAVD 88);
  - Street Location/Address; and
  - Nearest Cross Street.

A level 2 MACP inspection is required. The type of inspection performed and how information is gathered will be documented in NASSCO's MACP exchange database v.6.0 or approved equal. Comments regarding any unusual manhole characteristics or observations are to be documented in a comment section on the field forms. Examples include loose mortar or bricks, hydrogen sulfide damage, exposed rebar, dislocated cone, off-center frame, open lift holes, etc.

In the event that a manhole is determined to contain a flush valve (direct connection to potable water supply) the information shall be indicated on the field form in the comments section. A separate and complete listing of all manholes containing such a valve shall be provided to the City upon completion of the manhole inspection task.

Location of a hinge-type manhole in the field also requires prompt notification of the City to allow the alert of City personnel.

c) *Photographs* - A number of digital photographs are desirable in the completion of this project. *Digital* pictures shall have minimum resolution of 6 megapixels (3000 x 2000) (. As a minimum, the photographs required are:

- Area photograph(s) taken in a **north orientation** showing the ground level characteristics surrounding the cover and physical ground features impacting the manhole at ground level. See Figure 3-1 example. This will be identified as photograph number 1. The area photograph should include a plaque bearing the full manhole number or should have the manhole number digitally overlain on the photograph such that it will not interfere with the image of the manhole opening.
- Photograph taken while standing on the surface directly above the outlet of the manhole looking at the flow condition at the bottom of the manhole. The photograph shall be taken such that the top of the photo has a **north orientation**. See Figure 3-2 example. This will be identified as photograph number 2.

For internal inspections performed with pole camera:

- Photograph(s) of any manhole structural deterioration, iron/staining and infiltration defects, and any other extraordinary conditions. These additional images should be documented in the comments section of database. See Figure 3-3 example.
- Photographs of each pipe connection leaving or entering the manhole as identified on the inspection form. At least one photograph of each pipe connection shall be obtained with a measuring device visible in the photograph. See Figure 3-4 example.

Photographs shall be supplied as JPEG images or other approved format. Files are to be named using the full manhole number as discussed previously and the number assigned to the picture at that manhole based on the number of pictures taken and a date stamp following the YYYYMMDD format. For example, if three pictures are taken at manhole TN0105, the file names would be TN0105\_01\_20170325, TN0105\_02\_20170325, and TN0105\_03\_20170325, with the first being the vicinity photo, the second a downhole photo, and the third a photo of some other aspect. These filenames must be entered into the City database under the corresponding photo field.

Proper illumination of manhole interiors is necessary to obtain adequate photographs. Reliance on a camera flash only may result in poor quality photographs that may be rejected by the City.

d) *Inspections using 3D Scans*

- Scanner must be specifically designed and developed for use in manholes and have the capability to produce a three-dimensional representation of the manhole / wet well structure.

- Scanner must use high-resolution digital still cameras. Systems using video cameras will be deemed unacceptable.
- Cameras must be able to capture a minimum of 3000 lines of vertical resolution.
- The scanner must be able to adequately inspect manholes, vaults, or similar from 16" diameter to 120" in diameter or square, without the need of additional light sources.
- Scanner must be able to capture images 100% of the interior manhole wall without gaps.
- Scanner must have a built-in gyro stabilizing system to automatically align upward and downward images regardless of axial spin while lowering or retrieving the scanner in manholes.
- Upon completion of the inspection of the manhole, the software will generate a file that will allow the user to utilize a virtual camera to pan and tilt anywhere within the manhole depth. The user shall be able to use a computer mouse to move and stop anywhere in the manhole, turn a full circle on any axis, and zoom as if the user was using a real pan & tilt camera.
- Upon completion of the inspection of the manhole, the software will generate an unfolded view of the sidewalls that can be split anywhere in the radius of the manhole.
- User shall have the ability to measure features in the unfolded view in either inches or millimeters.

Manhole condition ratings shall be performed using the scanned images obtained in the field. The Manhole condition ratings shall follow NASSCO MACP v 6.0 industry standards and documented in the manhole inspection database.

**Figure 3-1**  
**Example Manhole Surface Photo**



**Figure 3-2**  
**Example Manhole Interior Photo**





**Figure 3-3**  
**Example Manhole Interior Condition Photo**



**Figure 3-4**  
**Example Pipe Photo (should also include manhole/pipe seal)**



## **4 DATA QUALITY REVIEW**

### **4.1 General**

Quality control/quality assurance reviews of the, photographs and database information shall be performed.

### **4.2 Quality Control Procedure**

#### **General Method**

*Inspectors* shall have a Random Number Quality Control procedure in place that is then audited by the City Project Manager. A random number is one of a series of numbers that have no detectable pattern, so that each and every item in a known population has an equal chance of being selected based upon the random number. A minimum of 5% of the *Inspector's* data shall be checked using a Random Number Quality Control procedure as the basis of selecting inspections for review during the first week of operation. If there is doubt about the results then the City Project Manager can ask for another differing set of Random Numbers to be created and be applied to the *Inspector's* crew in question, thereby generating another different set of inspections to be checked. A QC history must be created for each crew.

## **5 DATA FORMAT AND FORM**

Guidelines and expectations for the type of information to be gathered during a manhole inspection and facilities surveys are outlined in the previous sections. Data shall be recorded electronically in the field in place of paper field forms. Each field crew will become familiar with the City inspection requirements, NASSCO defect codes, and the condition rating and I/I flow rating criteria listed in the publication by the American Society of Civil Engineers' entitled Manual on Engineering Practice No. 92, '*Manhole Inspection and Rehabilitation*', *Second Edition* (ASCE Manual 92).

3D manhole condition assessments shall provide imagery and geometric data. The City shall be provided with the software required to view the digital film file, including full control of the virtual pan and tilt. The digital film files must include the following:

- a. An unfolded view of the manhole / wet well with a minimum of 3,000 lines of vertical resolution.
- b. The capability to produce a three-dimensional representation of the manhole / wet well structure.
- c. A distortion-free virtual pan and tilt allowing the review of the manhole / wet well structure from any angle at any depth. The virtual pan and tilt must consist of view from the bottom and top camera, any virtual pan and tilt that artificially creates this view from a single camera will be deemed unacceptable due to distorted images on the direct side view. The virtual pan and tilt and up/down direction of the view must be able to be controlled from a computer mouse.

Those conducting inspections and those who evaluate the information collected are expected to use their experience and best professional judgment to complete and generate usable and verifiable information for the City.

Manhole inspection data shall be submitted for entry into the City's Data Management System. Information documented in the field will be logged in the electronic field databases which must be submitted in City electronic format using Microsoft Access

## **6 DELIVERABLES**

Several deliverables will be expected throughout the project. The following deliverables shall be provided on DVD media or external hard drive:

- JPEG files of manhole inspection photographs
- Electronic manhole inspection database with inventory and condition data and photographs, in Microsoft Access format
- GPS coordinates of every manhole: Horizontal - North American Datum of 1983, (NAD 83), Mississippi State Plane Coordinate System, West Zone. Vertical - North American Vertical Datum 1988. (NAVD 88).
- MACP Inspection Report in PDF format (see example in Appendix B)
- A log of all landowners contacted
- A log of all manholes located in the field but not included on City maps
- A log of all manholes included on City maps but not located in the field
- 3D manhole condition assessment digital film file
- Software to view the 3D manhole condition assessment digital film file



## **APPENDIX A. DOCUMENTS**

A-1 Notice of Survey

## **NOTICE**

### **Sanitary Sewer Facilities Survey**

Dear Resident / Property Owner:

The City of Jackson has implemented a multi-year Wastewater Infrastructure Redevelopment Program to:

- Minimize sewer overflows
- Identify and address sewer system deficiencies
- Ensure adequate wastewater collection system capacity

You and your neighbors may notice members of our design and survey team in the area over the next several months. They are performing the fieldwork required for the design process. If you have any questions or concerns about this project, please contact ***Inspector's name*** at:

***Inspector's telephone number.***

## **APPENDIX B. EXAMPLE MACP INSPECTION REPORT**

## MACP INSPECTION REPORT

### HEADER AND COMPONENT OBSERVATION

Project: Phase 4

Owner: CoM

Customer:

MH Number	Access Type	Date	Time	Surveyor	Cert #	Drainage Area	Insp Level
NS101491	Manhole	2017/03/20	12:48	DS/NFRANKLI	U-416-07003795	NS10	Level 2

Address	City	Location Details
3910 RIDGEWAY RD	MEMPHIS	PARKING LOT

Location Code	Surface Type	MH Use	Purpose	Weather	Inspection Status	Pre-Cleaning
Sidewalk	CONPavement	Sanitary		Dry	Remote Inspection	No Pre-Cleaning

Rim to Invert	Grade to Invert	Rim to Grade	Potential for Runoff	Evidence of Surcharge
10.6	10.6	0	Sheeting	Yes

COVER	
Shape:	Circular
Type:	Vented
Diameter:	24
Width:	0
Material:	Cast Iron
# of Holes:	4
Hole Size:	> 1 inch (25mm) <= 1 1/2 inch ( )
Bearing Dia:	24
Bearing Wid:	0
Condition:	Sound
Fit:	Good

INSERT	
Type:	None
Condition:	

ADJUSTMENT RING	
Type:	Solid
Material:	Cast Iron
Condition:	Sound

FRAME	
Material:	Cast Iron
Bearing Wid:	1
Bearing Depth:	1
Diameter:	22
Condition:	Sound

FRAME SEAL	
Condition:	Sound
Offset (in):	0
I/I:	None

CHIMNEY	
Depth:	0
Material 1:	
Material 2:	
I/I:	

CONE	
Type:	Conical off centered
Material:	Concrete (non-reinforced)
Depth :	3.4

WALL	
Diameter:	48
Width:	
Material:	Concrete (non-reinforced)
Lining:	Cementitious
Depth :	9.8

BENCH	
Bench Present:	Yes
Material:	Concrete (non-reinforced)

CHANNEL	
Installed:	Yes
Material:	Concrete (non-reinforced)
Type:	Formed
Exposure:	Fully Opened

STEPS	
Number:	6
Material:	Plastic

Additional Information	
NO CHIMNEY	

## MACP INSPECTION REPORT

### MH HEADER AND COMPONENT OBSERVATION IMAGES

Surveyed By  
ADS/NFRANKLIN

Owner  
CoM

Date  
2017/03/20

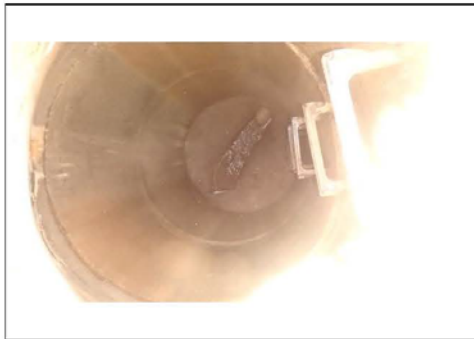
MH Number  
**NS101491**

#### Surface Image



S101491\_MACP\_20170320\_001.jp

#### Internal Image



S101491\_MACP\_20170320\_002.jp

## MACP INSPECTION REPORT

### PIPE CONNECTIONS

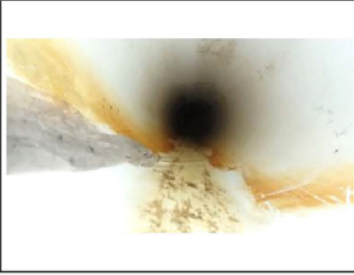
Surveyed By  
ADS/NFRANKLIN

Owner  
CoM

Date  
2017/03/20

MH Number  
NS101491

<b>P#1</b>	Direction	Clock Pos	Rim to Invert	Material	
	Out	6	10.7	PVC	
	Shape	Diameter	Width	Pipe Condition	Seal Condition
	C	8		Sound	Sound
	Special Condition		Conn Structure ID	Image Name	
Gravity Relief Connection		NS101490	P_20170320_003.jpg		
Comment					

<b>P#2</b>	Direction	Clock Pos	Rim to Invert	Material	
	In	1	10.5	CAS	
	Shape	Diameter	Width	Pipe Condition	Seal Condition
	C	6		Sound	Sound
	Special Condition		Conn Structure ID	Image Name	
Lateral to Building		NS101491L-01	P_20170320_004.jpg		
Comment					
SVC					

